

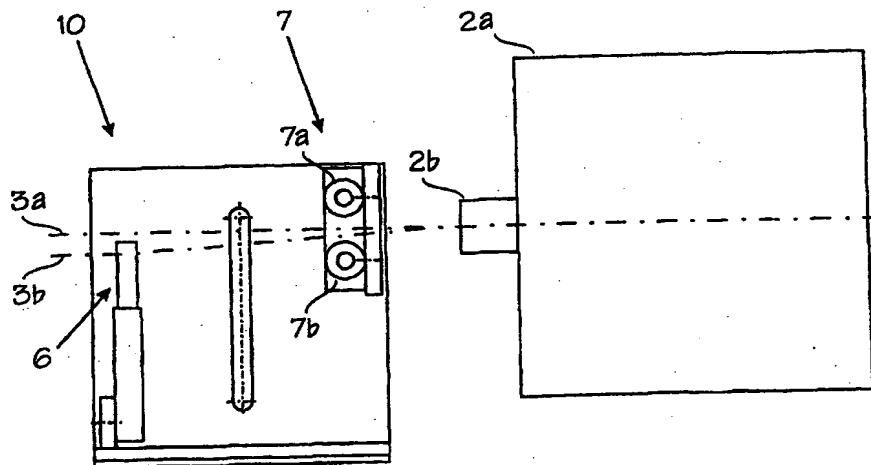
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(21) International Application Number: PCT/FI99/00531 (22) International Filing Date: 17 June 1999 (17.06.99) (30) Priority Data: 981425 18 June 1998 (18.06.98) FI (71) Applicant (for all designated States except US): NEXTROM HOLDING S.A. [CH/CH]; 37, route du Bois, CH-1024 Ecublens (CH). (72) Inventors; and (75) Inventors/Applicants (for US only): NYKÄNEN, Jari [FI/FI]; Ojahaanpolku 8 B 12, FIN-01600 Vantaa (FI). AUNOLA, Mika [FI/FI]; Anssinkatu 18, FIN-55100 Imatra (FI). OLKKONEN, Jukka [FI/FI]; Kirsitie 5 A, FIN-01800 Klaukkala (FI). (74) Agent: KOLSTER OY AB; Iso Roobertinkatu 23, P.O. Box 148, FIN-00121 Helsinki (FI).		(81) Designated States: AE, AL, AM, AT, AT (Utility model), AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, CZ (Utility model), DE, DE (Utility model), DK, DK (Utility model), EE, EE (Utility model), ES, FI, FI (Utility model), GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SK (Utility model), SL, TJ, TM, TR, TT, UA, UG, US, UZ, VN, YU, ZA, ZW, ARIPO patent (GH, GM, KE, LS, MW, SD, SL, SZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG). Published <i>Without international search report and to be republished upon receipt of that report.</i>

(54) Title: **METHOD AND ARRANGEMENT IN CONNECTION WITH OPTICAL FIBRE COATING**



(57) Abstract

The invention relates to a method and an arrangement in connection with coating of an optical fibre, wherein a first fibre (3a) is directed from a fibre pay-off forward in the process via a press head (2a) forming the coating, and when the first fibre (3a) ends, a new fibre (3b) is guided to the press head (2a) and through it. In order to provide a continuous process, the new fibre (3b) is directed to the vicinity of the press head (2a) in advance, and when the first fibre (3a) ends, a roll device (7) grips both the first fibre and the new fibre so that both fibres (3a, 3b) are caught between freely rotating rolls (7a, 7b) of the roll device (7), whereupon the tail of the first fibre (3a) makes the rolls (7a, 7b) of the roll device rotate, and the rotational movement of the rolls pushes the new fibre (3b) to the press head (2a) at a speed equal to that of the line.

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METHOD AND ARRANGEMENT IN CONNECTION WITH OPTICAL FIBRE COATING

The invention relates to a method in connection with coating of an optical fibre or the like, wherein a first fibre or the like is directed from a fibre pay-off forward in the process via a press head forming the coating, and when
5 the first fibre or the like ends, a new fibre or the like is guided to the press head and through it. The invention also relates to an arrangement in connection with an optical fibre or the like.

When a fibre ends in an optical fibre coating process, such as a
10 tight buffer process, also the buffer supplied from the press head breaks in prior art solutions. In such a situation, the line operator has been forced to manually thread the buffer again through the line, in other words to restart the process. In such a restart the amount of wasted fibre rapidly increases to several dozens of meters, which also raises the costs due to the loss of
15 material. Another problem has been that manual threading is laborious and slow, which further increases the costs and reduces the degree of use of the line. Further, manual threading is also an obvious security risk.

The purpose of the invention is to provide a method and an arrangement which eliminate the prior art drawbacks. This is achieved with the
20 method and arrangement according to the invention. The method according to the invention is characterized in that the new fibre or the like is directed to the vicinity of the press head in advance, so that when the first fibre or the like ends, a roll device grips both the first fibre and the new fibre or the like so that both fibres or the like are caught between freely rotating rolls of the roll device,
25 whereupon the tail of the first fibre or the like makes the rolls of the roll device rotate, whereafter the rotational movement of the rolls pushes the new fibre or the like to the press head at a speed equal to that of the line. The arrangement according to the invention is, in turn, characterized in that the arrangement comprises a holder and a roll device comprising two freely rotating rolls, which
30 have two positions: a first position where the rolls are spaced apart and a second position where the rolls are pressed together, the rolls being arranged before the press head at opposite sides of the fibre line passing through the press head, and the holder being arranged to keep the end of the new fibre or the like near the press head such that the end of the new fibre or the like is
35 positioned between the rolls placed in the first position of the roll device as the first fibre or the like travels from between the rolls of the roll device to the press

head, and that when the first fibre or the like ends, the rolls of the roll device are arranged to move into the second position so that both the first fibre and the new fibre or the like remain between the rolls and the tail of the first fibre or the like makes the rolls rotate, and the holder is arranged to open, whereupon
5 the rotational movement of the rolls pushes the new fibre or the like to the press head at a speed equal to that of the line.

A primary advantage of the invention is that it avoids the time-consuming and laborious manual restart, wherefore the amount of wasted fibre remains as small as possible. The invention thus provides economic
10 advantages due to lower fibre costs and an improved degree of use of the line. Further, the structure of the arrangement according to the invention is simple and reliable. The invention also improves the operational safety of the line since the operator does not have to thread a fibre manually through the entire line or to feed a new fibre into the process during the operation of the line.

15 In the following, the invention will be described in greater detail by means of a preferred embodiment shown in the accompanying drawing, in which

Figure 1 is a general view of a fibre coating line,

Figure 2 is a side view of an arrangement according to the
20 invention, and

Figure 3 shows the arrangement of Figure 2 viewed from the direction of travel of the fibre.

Figure 1 shows generally a line used for coating an optical fibre. In Figure 1, reference numeral 1 generally denotes fibre pay-offs and reference
25 numeral 2 denotes a press apparatus comprising an actual press head and other means which are used to provide the surface of an optical fibre with a coating. The optical fibre is denoted in Figure 1 by reference numeral 3. Reference numeral 4 denotes generally means used for cooling the coated fibre, and reference numeral 5 correspondingly denotes means for winding the
30 coated fibre onto a reel. Reference numeral 10 denotes an arrangement according to the invention, reference numeral 11 denotes a diameter measuring device, and reference numeral 12 denotes a pulling device for an optical fibre cable. Reference numeral 13 denotes a line control unit.

The aforementioned matters constitute fully conventional
35 technology to those skilled in the art, wherefore they will not be described in greater detail herein.

When a fibre is coated on a line shown in Figure 1, in prior art solutions the coating process has been interrupted after the fibre supplied from the fibre pay-off 1 has ended, whereafter the operator has been forced to manually thread a new fibre from the fibre pay-off through the entire line.

5 However, this kind of procedure causes problems, as described above.

The invention relates to a method and an arrangement which enable continuous fibre coating. Therefore the line operator is able to prepare a new fibre during the process to be ready when the old fibre runs out. When this happens, the arrangement according to the invention begins to operate and feeds a new fibre to the press head without the process being interrupted. The fibre joint can be marked and removed in subsequent process steps.

The arrangement according to the invention is described in Figures 2 and 3. The arrangement shown in Figures 2 and 3 is placed on the coating line at a point immediately preceding the press head. The arrangement comprises a holder 6 and a roll device 7, which comprises two freely rotating rolls 7a, 7b. The rolls 7a, 7b are made movable with two positions: a first position where the rolls are spaced apart and a second position where the rolls are pressed together. Figures 2 and 3 show the first position of the rolls. The rolls 7a, 7b are arranged before the press head 2a at opposite sides of the fibre line passing through the press head.

The holder 6 is arranged to keep the end of a new fibre or the like near the press head, such that the end of the new fibre or the like 3b is positioned between the rolls 7a, 7b placed in the first position of the roll device as the first fibre or the like 3a travels between the rolls of the roll device to the press head. This is shown clearly in Figure 2.

When the first fibre or the like 3a ends, the rolls 7a, 7b of the roll device are arranged to move to the second position, so that both the first fibre and the new fibre or the like remain between the rolls, and the tail of the first fibre or the like makes the rolls 7a, 7b rotate. In this situation, the holder 6 is arranged to open so that the rotating movement of the rolls 7a, 7b pushes the new fibre or the like 3b to the press head 2a at a speed equal to that of the line.

The rolls 7a, 7b are moved together or spaced apart by means of pressurized air, for example. The rotation of the rolls does not require separate actuators, but the rolls rotate freely. The rotational movement of the rolls is achieved solely by means of the tail of the first fibre or the like.

As stated above, the rolls 7a, 7b are open, which means that they are spaced apart during the coating process and the first fibre or the like 3a travels from between them to the press head 2a. The operator may place a new fibre in the holder 6 already during the process so that the end of the new fibre extends from between the rolls to a guide cone 2b provided in the press head 2a. This situation is shown in Figure 2.

When the first fibre or the like 3a ends, the control system of the apparatus is informed of the situation, whereafter the rolls 7a, 7b are pressed together and the holder 6 is opened. Control information can be received from any suitable component, such as a fibre break sensor provided in the fibre pay-off. When the rolls press against one another, both the tail of the first fibre or the like 3a and the beginning of the new fibre remain between the rolls, and the progressive movement of the tail of the first fibre 3a makes the rolls 7a, 7b rotate, whereupon the rotational movement of the rolls moves or pushes the new fibre or the like 3b towards the press head at a speed equal to that of the line. Since the coating emerging from the press head breaks easily due to variation in tension, the line control unit may adjust the line process parameters momentarily during the jointing process so that the tension variation is minimized. For example, the line control may supply an additional accelerating signal to the fibre pay-off in order to provide sufficiently fast acceleration during the jointing process compared to normal operation.

The holder 6 can be formed of, for example, two flat surfaces 6a, 6b that are arranged to press together and to move to a distance from one another in a desired manner. The holder can also be implemented by means of two rolls, which are arranged such that they can be pressed together and spaced apart. The rolls must be mounted in bearings so that they only rotate in the direction of travel of the fibre or the line.

The operation of both the holder and the roll device can be implemented by means of any suitable arrangement, such as the use of pressurized air, an electric motor and so forth.

The embodiment described above is not intended to restrict the invention in any way, but the invention can be varied freely within the scope of the claims. Therefore it is clear that the arrangement according to the invention or the details thereof do not have to be exactly identical to those shown in the figures, but also other solutions are possible. For example, the invention is not restricted to only one fibre, but the invention can also be

applied in the coating of more than one fibre. The expression 'fibre or the like' must be understood in the aforementioned scope. Nor is the invention restricted to only one coating material, but it can be applied in connection with various materials, in which case the invention is modified according to the needs of the material. Examples include PVC and polyamide. When using polyamide, the fibre must first be dried with a heat radiator, for example, which can be placed before the holder. Such an arrangement is naturally included within the scope of the invention. It is also clear that the scope of the invention includes an application comprising air blow that hardens the plastic after the press head, so that the coating does not break during the jointing step. The invention can also be applied in connection with a breaking device, wherein the reel storing the first fibre is not emptied entirely, but the fibre is cut at a certain moment and the process is continued with a new fibre as described above. Further, it is clear that the scope of the invention also includes an application where the jointing is activated already before the first fibre or the like breaks or is cut.

CLAIMS

1. A method in connection with coating of an optical fibre or the like, wherein a first fibre or the like (3a) is directed from a fibre pay-off forward in the process via a press head (2a) forming the coating, and when the first fibre or the like (3a) ends, a new fibre or the like (3b) is guided to the press head (2a) and through it, **characterized** in that the new fibre or the like (3b) is directed to the vicinity of the press head (2a) in advance, so that when the first fibre or the like (3a) ends, a roll device (7) grips both the first fibre and the new fibre or the like so that both fibres or the like (3a, 3b) are caught between freely rotating rolls (7a, 7b) of the roll device (7), whereupon the tail of the first fibre or the like (3a) makes the rolls (7a, 7b) of the roll device rotate, whereafter the rotational movement of the rolls pushes the new fibre or the like (3b) to the press head (2a) at a speed equal to that of the line.
2. An arrangement in connection with coating of an optical fibre or the like, wherein a first fibre or the like (3a) is arranged to be directed from a fibre pay-off forward in the process via a press head (2a) forming the coating, and when the first fibre or the like (3a) ends, a new fibre or the like (3b) is arranged to be guided to the press head (2a) and through it, **characterized** in that the arrangement comprises a holder (6) and a roll device (7) comprising two freely rotating rolls (7a, 7b), which have two positions: a first position where the rolls (7a, 7b) are spaced apart and a second position where the rolls (7a, 7b) are pressed together, the rolls being arranged before the press head at opposite sides of the fibre line passing through the press head (2a), and the holder (6) being arranged to keep the end of the new fibre or the like (3b) near the press head (2a) such that the end of the new fibre or the like (3b) is positioned between the rolls (7a, 7b) placed in the first position of the roll device as the first fibre or the like (3a) travels from between the rolls of the roll device to the press head, and that when the first fibre or the like (3a) ends, the rolls (7a, 7b) of the roll device are arranged to move into the second position so that both the first fibre and the new fibre or the like remain between the rolls and the tail of the first fibre or the like (3a) makes the rolls (7a, 7b) rotate, and the holder (6) is arranged to open, whereupon the rotational movement of the rolls (7a, 7b) pushes the new fibre or the like (3b) to the press head (2a) at a speed equal to that of the line.

3. An arrangement according to claim 2, **characterized** in that the holder (6) is formed of two flat surfaces (6a, 6b), which are arranged to press together.

4. An arrangement according to claim 2, **characterized** in
5 that the holder (6) is formed by means of two rolls which are arranged to press together and to rotate only in the direction of travel of the fibre or the like.

5. An arrangement according to any one of preceding claims 2 to 4, **characterized** in that the driving force behind the holder (6) and the roll device (7) is pressurized air.

10 6. An arrangement according to any one of preceding claims 2 to 4, **characterized** in that the driving force behind the holder (6) and the roll device (7) is an electric motor.

Fig. 1

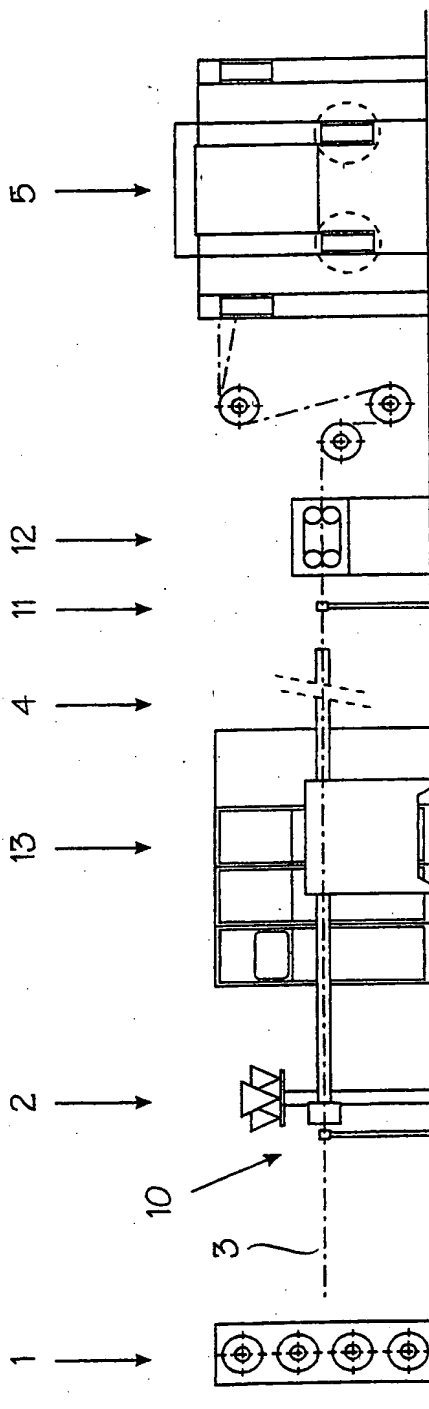


Fig. 2

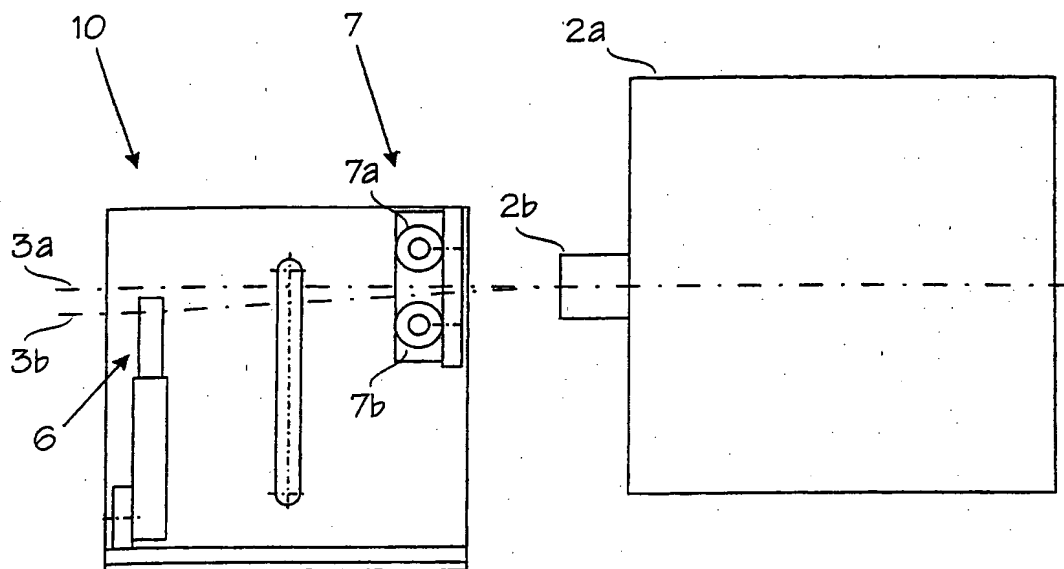
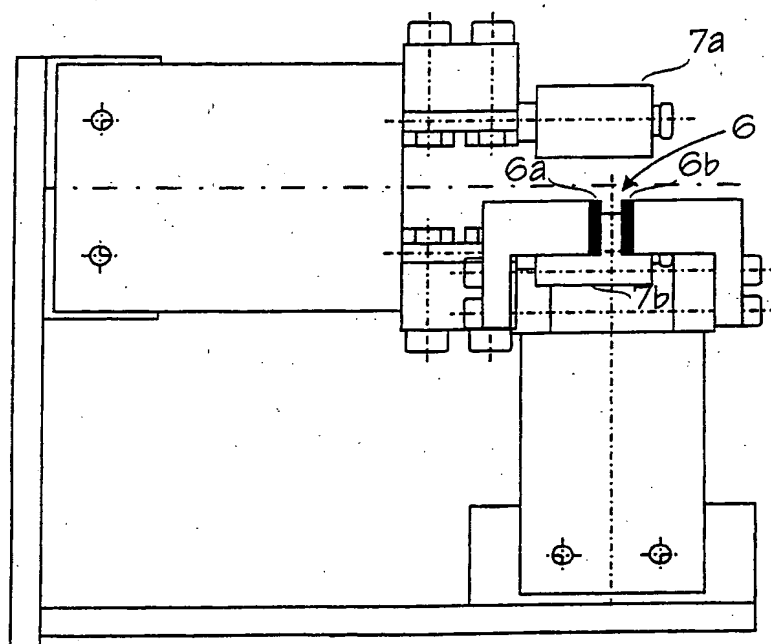


Fig. 3



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(71) Applicant (for all designated States except US): NEXTROM HOLDING S.A. [CH/CH]; 37, route du Bois, CH-1024 Ecublens (CH).			
(72) Inventors; and (75) Inventors/Applicants (for US only): NYKÄNEN, Jari [FI/FI]; Ojahaanpolku 8 B 12, FIN-01600 Vantaa (FI). AUNOLA, Mika [FI/FI]; Anssinkatu 18, FIN-55100 Imatra (FI). OLKKONEN, Jukka [FI/FI]; Kirsitie 5 A, FIN-01800 Klaukkala (FI).			
(74) Agent: KOLSTER OY AB; Iso Roobertinkatu 23, P.O. Box 148, FIN-00121 Helsinki (FI).			Published With international search report.
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<p>The diagram illustrates a method and arrangement for coating an optical fibre. A fibre (3a) is fed from a fibre pay-off (10) through a press head (2a) to form a coating. A new fibre (3b) is guided in advance. A roll device (7) with rolls (7a, 7b) grips both fibres. The rolls rotate to push the new fibre (3b) to the press head (2a) at a speed equal to the line speed.</p>			
(57) Abstract			
<p>The invention relates to a method and an arrangement in connection with coating of an optical fibre, wherein a first fibre (3a) is directed from a fibre pay-off forward in the process via a press head (2a) forming the coating, and when the first fibre (3a) ends, a new fibre (3b) is guided to the press head (2a) and through it. In order to provide a continuous process, the new fibre (3b) is directed to the vicinity of the press head (2a) in advance, and when the first fibre (3a) ends, a roll device (7) grips both the first fibre and the new fibre so that both fibres (3a, 3b) are caught between freely rotating rolls (7a, 7b) of the roll device (7), whereupon the tail of the first fibre (3a) makes the rolls (7a, 7b) of the roll device rotate, and the rotational movement of the rolls pushes the new fibre (3b) to the press head (2a) at a speed equal to that of the line.</p>			

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A	US 5505398 A (EMMERICH), 9 April 1996 (09.04.96)	1-6
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